

REMARKS

Applicant wishes to express his appreciation for the detailed review and analysis conducted by the Examiner, and for his time, and courtesy, and helpful suggestions in the course of a telephonic interview on 9 January 2007.

Claims 1-32 have been pending in this application. Claim 24 is herewith cancelled as redundant.

It is noted with appreciation that claims 5-7, 15-20, 23, and 27-32 have been found to contain allowable subject matter, pending obviating the 35 U.S.C. 112 rejections.

With regard to the Power of Attorney, the duly executed Ownership statement is attached.

As to support for the subject matter of claim 11, paragraph 0010 and claim 11 have both been amended for clarification and consistency. No new matter has been added.

Objections under 35 U.S.C. 132(a)

The objection to paragraph 0022 of the specification under 35 U.S.C. 132(a) has been responded to by correcting the material objected to.

Regarding the amendments in paragraph 0029, lines 6 - 8, Applicant disagrees with the Examiner's statement that these portions add new matter. Original paragraph 0029 defines various "approximate" factors between the respective radii and further adds the remark that these factors may also vary by 10% in both directions. In addition, there is claimed in claim 3 that the radii of curvature of the radially inward portions are at least 50% or preferably 100% greater than the radii of curvature of the corresponding radially outer portions of the front faces and back faces, respectively. This certainly supports the use of "about" in this paragraph.

Regarding paragraph 0031, line 5, the term "approximately" before "100%" is fully supported by the exact same language in original paragraph 0010.

Other corrections have been made to paragraphs 0029 and 0031 for internal consistancy.

The antecedent basis matters relating to claim 11 and 30 have been met by appropriate changes to paragraphs 0010 and 0022 of the specification.

Rejections Under 35 U.S.C. 112, First Paragraph

Claims 1-32 have been rejected as failing to comply with the written description requirement. Some of the claims specifically identified have been revised to overcome these rejections, these include claims 1, 14, 15, 16, 19, 20, 22, 28, 31, and 32. Applicant disagrees with the Examiner with respect to several claims. The words “at least” and “about” in claims 23, and 25 are fully supported by paragraph 0029. Paragraph 0022 fully supports the word “about” in claims 17 and 18. Paragraph 0019 fully supports the use of “about” in claim 28, but that word has been changed to “approximately” for exact equivalence. The use of “about” at line 2 of claim 32 has been changed in the same way, supported by paragraph 0017.

Rejections Under 35 U.S.C. 102(b) and 103(a)

Claims 1-3, 21, and 22 have been rejected as anticipated by Bevans patent 289,958; claims 1, 2, 8,-10, 21, and 24 have been rejected as anticipated by Fujii patent 3,140,042; claims 1-4, and 21 have been rejected as anticipated by Saiki patent 6,007,300 (Fig. 8); claims 11-14, 25, and 26 have been rejected as obvious over Fujii.

In a good faith attempt to efficiently conclude prosecution of this application, claim 1 has been amended to better define the invention and to make more clear its distinction from Bevans, Fujii, and Saeki.

When considering the prior art, it is significant that there is a principle difference between a turbine wheel, the subject of the present invention, and a fan or fan wheel for a centrifugal fan. While the blades of a turbine wheel are acted upon by means of a fluid in order to drive the turbine wheel and a shaft thereof which in turn drives any other means like tools or the like, a fan blade is driven via a shaft and acts upon a fluid (general a gas or liquid). The Saeki and Fujii references cited by the examiner are centrifugal fans which are designed to suck the fluid along a substantially axial direction of the fan wheel and to expel the fluid along the radial direction between the fan blades, the fluid being radially expelled due to centrifugal forces upon rotation of the wheel.

In contrast, for a turbine wheel the fluid medium impinges on the blades of the turbine wheel and is in general not (at least not merely) guided radially inward and then axially, but may also be expelled along the radial outward direction again or immediately along the axial direction from between the blades after impinging on the blade. In other words, these differences are not just a reverse direction of flow of the fluid and not just a reverse action on or by the wheel. In the real, practical world of technology, the reality of these differences lead to the conclusion that hardly anything can be learned from the design of fan blades when designing turbine blades. While fan wheels and fan blades are designed for a maximum flow of the fluid along a well defined flow path (with a given amount of driving force), a turbine wheel is designed to generate a maximum of power or speed of rotation, or both, of the shaft by means of the stream of fluid impinging on the blades, wherein the further flow of the fluid when leaving the blades or the space between the blades is of only little effect and importance, if any.

Further, it is common in this field of art to use the terms "front" and "back" in reference to the actual movement of the blades upon the ordinary rotation of the wheel, that is, the front face of a blade points toward the direction of movement or rotation and therefore Applicant believes that

the terms "front face" and "back face" of the turbine wheels are clearly distinguishing the structure of the blade over those of the fan wheels of the above mentioned prior art documents. This standard usage is clearly set forth in paragraph 0005 of the specification. In this respect it should be noted that both Fujii and Saeki use the terms "forward," "front," and "back" in the same meaning as these terms are used in the present invention, namely such that a front face or forward face is leading in the direction of movement of the blade upon normal rotation of the wheel. It is thus clear that a skilled person would clearly recognize that a convex front face and concave back face specifies a different structure from a concave front face and a convex back face as long as the claimed subject matter is not a just blade, as such, but instead is a rotatable wheel which in use has a well defined direction of rotation so that also the front and back faces of the blades are clearly defined.

Regarding a purpose of the present invention, Applicant volunteers that the present invention actually starts out from a state of art as defined in cited GB 2,190,606 A, which shows a turbine wheel for a rotary spray atomizer. These atomizers and the respective turbine wheels are designed for and required to have a very high speed of rotation, and to achieve this object the respective turbine wheel as shown in Fig. 6 of this document is given a rather complicated and intricate design. It is a purpose of the present invention to provide a corresponding turbine wheel for high speed rotation which can be used in a spray atomizer but has a less complicated design and is much easier and cheaper to manufacture. The present claims do not in any way read on this UK reference.

In that respect, it is true that the turbine wheel disclosed by Bevans, which is provided for driving a sewing machine, is also made of a rather simple design even though the actual structure thereof is just too simple to generate the high rotational speeds required and intended for the

present invention. Applicant believes that the structural differences in relation to Bevans which serve for achieving the stated purpose of the invention are defined in the claims as presently amended.

One of the distinguishing features is, of course, that the present turbine wheel has blades with radially inward portions having radii of curvature, while the radially inward portions of the device shown by Bevans are simply straight. They would not be considered by a skilled person as having a "radius of curvature," because such a radius would be infinite and straight faces are generally not referred to as having a radius of curvature. The respective difference has now been made even clearer by specifying that the convex front surface has convex inner and outer portions. That is not true for the straight inner portion of the Bevans device

Moreover, Applicant has clarified the actual meaning of the wording "such that at least portions of the front face have a lesser radius of curvature than the back face," which was actually meant to say that those portions of the front face have a lesser radius of curvature than any portion of the back face. This has been clarified by introducing the wording "that at least portions of the front face have a lesser radius of curvature than both the radially inner and the radially outer portions of the concave back face."

This is clearly not the case with Bevans, since Bevans shows a blade which apparently is made of sheet metal having a uniform thickness and the radially outer portions of the blades are just bent. The front face and the back face of these radially outward portions are curved about the same center, because the blade therebetween has uniform thickness. Accordingly, the front face being bent about the same center of curvature must have a larger radius than the inner face, wherein the difference in radii is just the thickness of the blade.

In order to even better emphasize the distinguishing features over Bevans, Applicant has further added the requirement that the convex front face has “a convex radially outer portion and a convex radially inward portion” while the concave back face has “a concave radially outer portion and a concave radially inward portion.” In contrast, Bevans only shows straight inward portions on both sides.

Regarding the fan of Saeki, the radial outer portions of the blades have lesser radii of curvatures than the radial inner portions on both the front face and the back face. Moreover the smallest radius of the front face is larger than the smallest radius on the back face because, like Bevans, the blades are made of sheet material (sheet metal), the respective portions having a common center of curvature such that the respective radii differ by the thickness of the blade, just the opposite of what is claimed, at least partially because the front face of the Saeki blade is the concave side thereof.

Moreover, as already indicated, this reference is directed to a centrifugal multi-blade fan which is not a turbine wheel and which is designed for a completely different purpose, namely, to generate a stream of a fluid and to have a well defined flow thereof rather than employing a fluid to drive a shaft.

The same holds for the Fujii fan. While the structure of the blade as shown by Fujii at first glance is similar to the blade of the present invention, the larger radii of curvature are provided at the radial outer portions instead at the radial inner portion and also the front and back faces are reversed as regards the direction of rotation of the respective wheel, which is simply due to the fact that also Fujii provides a wheel for a centrifugal fan.

CONCLUSION

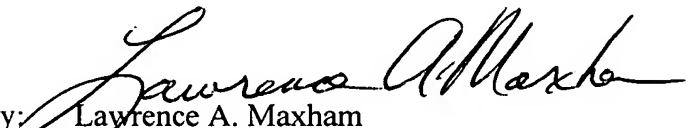
Applicant believes that all of the objections and rejections have been met and that the claims in this application define patentable invention over the applied references. Further, this Amendment does not require additional searching because no definitions or elements have been changed. The limitations that have been clarified have previously been presented in the claims.

Reconsideration and early indication of allowance of all claims is requested. Should any issues remain unresolved, the Examiner is invited to telephone the undersigned attorney.

The Commissioner is hereby authorized to charge any fees that arise in connection with this filing which are not covered by the money enclosed, or credit any overpayment, to Deposit Account No. 02-0460.

Respectfully submitted,

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STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: Bernhard SchmittApplication No./Patent No.: 10/766,680 Filed/Issue Date: 29 January 2004Entitled: TURBINE WHEEL FOR DRIVING RAPIDLY ROTATING TOOLS

GAT Gesellschaft für Antriebstechnik mbH

(Name of Assignee)

German Corporation

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The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

X Bernhard Thiel Prokurist Fuchs

X 05/01/2007
Date

X both are Prokurists and entitled to act this

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